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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,966	12/20/2001	Rongqing Hui	1780	1436
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SPRINT 6391 SPRINT PARKWAY KSOPHT0101-Z2100 OVERLAND PARK, KS 66251-2100			WANG, QUAN ZHEN	
			ART UNIT	PAPER NUMBER
			2633	

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

8m

Office Action Summary	Application No. 10/027,966	Applicant(s) HUI ET AL.	
	Examiner Quan-Zhen Wang	Art Unit 2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-10 and 12-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10 and 12-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, recites the limitation "wherein the first optical signals and second optical signals are aligned with the principal states of polarization of an optical fiber". However, it is not clear how is the recited fiber fit to the system related to the claimed method.

Claim 10, recites the limitation "wherein the first optical signals and second optical signals are aligned with the principal states of polarization of an optical fiber". However, it is not clear how is the recited fiber fit to the claimed system.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claims 1,5-6, 10, 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buhrer (U.S. Patent US 3,435,229) in view of the admitted prior art (APA) figure 1.

Regarding claims 1 and 10, as it is understood in view of the above 112 problem, Buhrer teaches an apparatus and method (fig. 1) to process a received optical signal that carries user information, the apparatus and method comprising: a splitter (fig. 1, 40) configured to split the received optical signal based on polarization into a first optical signal and a second optical signal (fig. 1, E43 and E44), a first converter (fig. 1, 43) connected to the splitter and configured to convert the first optical signal into a corresponding first electrical signal (fig. 1, E22), a second converter (fig. 1, 42) connected to the splitter and configured to convert the second optical signal into a corresponding second electrical signal (fig. 1, E21); and a detection system (fig. 1, 50 and 51) applying radio frequency detection (fig. 1, 51) to the first electrical signal to generate a third electrical signal (fig. 1, E25), applying radio frequency detection (fig. 1, 50) to the second electrical signal to generate a fourth electrical signal (fig. 1, E24), and combining the third and fourth electrical signal to form a fifth electric signal that carries the user information (fig. 1, E26). The system of Buhrer differs from the claimed invention in that Buhrer does not specifically teach that the measured signal is transmitted over an optical fiber and the first and second optical signals are aligned with the principal states of polarization of the optical fiber. However, it is well known in the art to transmit optical signals in an optical fiber and use a polarization controller to align the polarization of the transmitted signals with other optical elements, such as a

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polarization beam splitter. For example, the APA of the instant application fig. 1, teaches an optical fiber (fig. 1, 104) to convey optical signals and a polarization controller (fig. 1, 106) to align the polarizations of the transmitted signals with the splitter (fig. 1, 110). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate an optical fiber and a polarization controller, as it is taught by the APA, into the system of Buhrer and align the first optical signal and the second optical signal with the principal states of polarization of the optical fiber in order to transmit the optical signals over a long distance without significant signal losses.

Regarding claims 5, 14, Buhrer further teaches that the RF detection to the first electrical signal to generate the third electrical signal further comprises generating an (sixth) electric signal (fig. 1, 53) and mixing the electrical signal with the first electrical signal (fig. 1, 51).

Regarding claims 6, 15, Buhrer further teaches that the RF detection to the second electrical signal to generate the fourth electrical signal further comprises shifting a phase of the electrical signal (fig. 1, 52) and mixing the electrical signal with the second electrical signal (fig. 1, 50).

3. Claims 1, 7-8, 10 are rejected are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibutani (U.S. Patent US 4,972,515) in view of the admitted prior art (APA) figure 1.

Regarding claims 1 and 10, Shibutani teaches an apparatus and method (fig. 1) to process a received optical signal that carries user information, the apparatus and method comprising: a splitter (fig. 1, 15) configured to split the received optical signal based on polarization into a first optical signal and a second optical signal (fig. 1, arrows from 15 to 16 and 17), a first converter (fig. 1, 16) connected to the splitter and configured to convert the first optical signal into a corresponding first electrical signal (fig. 1, the arrow output from 16), a second converter (fig. 1, 17) connected to the splitter and configured to convert the second optical signal into a corresponding second electrical signal (fig. 1, the arrow output from 17); and detection systems (fig. 1, 31 and 32) applying radio frequency detection (fig. 1, 35) to the first electrical signal to generate a third electrical signal, applying radio frequency detection (fig. 1, 38) to the second electrical signal to generate a fourth electrical signal, and combining the third and fourth electrical signal (fig. 1, 43) to form a fifth electric signal that carries the user information (fig. 1, 12). The system of Shibutani differs from the claimed invention in that Shibutani does not specifically teach that the measured signal is transmitted over an optical fiber and the first and second optical signals are aligned with the principal states of polarization of the optical fiber. However, it is well known in the art to transmit optical signals in an optical fiber and use a polarization controller to align the polarization of the transmitted signals with other optical elements, such as a polarization beam splitter. For example, the APA of the instant application fig. 1, teaches an optical fiber (fig. 1, 104) to convey optical signals and a polarization controller (fig. 1, 106) to align the polarizations of the transmitted signals with the splitter (fig. 1, 110). Therefore, it would

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have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate an optical fiber and a polarization controller, as it is taught by the APA, into the system of Shibutani and align the first optical signal and the second optical signal with the principal states of polarization of the optical fiber in order to transmit the optical signals over a long distance without significant signal losses.

Regarding claims 7-8, Shibutani further teaches to apply bandpass filters (fig. 1, 34, 37) to the first and second electrical signals, and apply square law detectors (fig. 1, 35, and 38) to the first and second electrical signals.

4. Claims 9 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buhner (U.S. Patent US 3,435,229) in view of the admitted prior art (APA) figure 1 and further in view of Way et al. (U.S. Patent Application Publication US 2002/0030877 A1).

Regarding claims 9 and 18, the modified system of Buhner and the APA differs from the claimed invention in that Buhner and the APA do not specifically teach that the received signal is sub-carrier modulated. However, it is well known that an optical signal can be sub-carrier modulated. For example, Way teaches an optical signal is a sub-carrier modulated signal (paragraph 0005, lines 10-17). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to direct a sub-carrier modulated signal, such as the one taught by Way, into the modified system of Buhner and the APA in order to compensate the polarization degradation of the sub-carrier optical signal.

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5. Claims 1, 3-4, 10, 12-13, are rejected under 35 U.S.C. 103(a) as being unpatentable over admitted prior art in view of Buhrer (U.S. Patent US 3,435,229).

Regarding claims 1 and 10, the admitted prior art (fig. 1) teaches an apparatus and method of processing a received optical signal that carries user information, the apparatus and method comprising: splitting (fig. 1, 110) the received optical signal based on polarization into a first optical signal (fig. 1, 114) and a second optical signal (fig. 1, the signal passing through 112); wherein the first optical signal and the second optical signal are aligned (by the polarization controller 106) with the principal states of polarization of an optical fiber (fig. 1, 104). The admitted prior art (fig. 1) differs from the claimed invention in that the admitted prior art (fig. 1) does not specifically teach converting the first optical signal into a corresponding first electrical signal; converting the second optical signal into a corresponding second electrical signal; applying radio frequency detection to the first electrical signal to generate a third electrical signal, applying radio frequency detection to the second electrical signal to generate a fourth electrical signal, and combining the third and fourth electrical signal to form a fifth electric signal that carries the user information. However, Buhrer teaches converting the first optical signal into a corresponding first electrical signal (fig. 1, E22); converting the second optical signal into a corresponding second electrical signal (fig. 1, E21); applying radio frequency detection (fig. 1, 51) to the first electrical signal to generate a third electrical signal (fig. 1, E25), applying radio frequency detection (fig. 1, 50) to the second electrical signal to generate a fourth electrical signal (fig. 1, E24), and combining the third and fourth electrical signal to form a fifth electric signal that carries the user

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information (fig. 1, E26). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply the signal detection method taught by Buhrer in the apparatus taught by the admitted prior art (fig. 1) in order to increase the reception sensitivity of optical signals using a polarization diversity receiving device.

Regarding claim 3-4, 12-13, the admitted prior art, fig. 1 of the current application, further teaches to control the polarization of the optical signal to align with the polarization of the received optical signal with a principal axis of the polarization beam splitter, and the polarization controller is controlled by instructions from a feedback loop that processes the electrical signal that carries the user information, and this signal reads the claimed fifth electrical signal.

6. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buhrer (U.S. Patent US 3,435,229) in view of the admitted prior art (APA) figure 1 and further in view of Shibutani (U.S. Patent US 4,972,515).

Regarding claims 16-17, The modified system of Buhrer and the APA differs from the claimed invention in that Buhrer and the APA do not specifically teach to apply bandpass filters to the first and second electrical signals, and apply square law detectors to the first and second electrical signals. However, Shibutani further teaches to apply bandpass filters (fig. 1, 34, 37) to the first and second electrical signals, and apply square law detectors (fig. 1, 35, and 38) to the first and second electrical signals. Therefore, it would have been obvious for one of ordinary skill in the art at the time

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when the invention was made to apply bandpass filters to the first and second electrical signals; and applying square law detectors to the first and second electrical signals to process the first and second electrical signals, as it is taught by Shibutani, in the modified system of Buhrer and the APA in order to reject out-band noises and identify the spectral or frequency components of the optical signal which have been reduced in magnitude or nullified due to dispersion.

Response to Arguments

1. Applicant's arguments with respect to claims 1,3-10,12-18 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 8:30 AM - 5:00 PM, Monday - Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qzw
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